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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

BARAN, MARY C

ART UNIT

PAPER NUMBER

2857

DATE MAILED: 09/10/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>		<b>Applicant(s)</b>	
	10/769,902		STEDMAN ET AL.	
	<b>Examiner</b>		<b>Art Unit</b>	
	Mary Kate B Baran		2857	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 03 February 2004.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 21-32 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 21-32 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 21 is rejected under 35 U.S.C. 102(b) as being anticipated by Dec (U.S. Patent No. 6,025,920).

Referring to claim 21, Dec discloses a system for measuring an opacity value for an exhaust emission plume (see Dec, col. 4 lines 29-32), a source of electromagnetic radiation (see Dec, Fig. 1, light source 110) that is directed through an exhaust emission plume (see Dec, Fig. 1, exhaust plume 145), a detector that detects the electromagnetic radiation (see Dec, Fig. 1, detector) and outputs a detector signal proportional to the detected electromagnetic radiation (see Dec, col. 4 lines 29-32), and a processor that receives the detector signal and calculates an opacity value for the exhaust plume based, at least in part, upon the detector signal (see Dec, col. 4 lines 29-32).

### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 22, 24 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dec (U.S. Patent No. 6,025,920) in view of Jack et al. (U.S. Patent No. 5,831,267).

Referring to claim 22, Dec teaches all the features of the claimed invention except one or more sources which emit electromagnetic radiation in a first wavelength region, a second wavelength region, and a third wavelength region.

Jack et al. discloses one or more sources which emit electromagnetic radiation in a first wavelength region, a second wavelength region, and a third wavelength region (see Jack et al., col. 4 lines 10-17). Jack et al. explain that the electromagnetic radiation emitted has a plurality of predetermined wavelengths (see Jack et al., Abstract), which are used to identify multiple pollutants found within the exhaust plume (see Jack et al., col. 4 lines 48-64).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Dec to include the teachings of Jack et al. because detection of multiple wavelengths allows the skilled artisan to determine multiple constituents within an emission plume (see Jack et al., col. 4 lines 10-17).

Referring to claim 24, Dec teaches all the features of the claimed invention except that the detector is enabled to detect electromagnetic radiation in each of the first, second and third wavelength regions and outputs a signal proportional

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to a detected intensity at each of the first, second, and third wavelength regions, and a comparison module that compares the intensity of each of the first, second, and third wavelength regions.

Jack et al. discloses that the detector is enabled to detect electromagnetic radiation in each of the first, second and third wavelength regions and outputs a signal proportional to a detected intensity at each of the first, second, and third wavelength regions (see Jack et al., col. 5 lines 63-67), and a comparison module that compares the intensity of each of the first, second, and third wavelength regions (see Jack et al., col. 6 lines 18-23).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Dec to include the teachings of Jack et al. because detection and comparison of multiple wavelengths allows the skilled artisan to determine multiple constituents within an emission (see Jack et al., col. 4 lines 10-17).

Referring to claim 25, Dec teaches a processor which determines the opacity value proportional to the change in intensity for the detected intensity of a wavelength (see Dec, col. 4 lines 1-6), but does not teach a first, second, and third wavelength regions.

Jack et al. teach a first, second, and third wavelength regions (see Jack et al., col. 3 lines 1-3).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Dec to include the teachings of Jack et al. because

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detection and comparison of multiple wavelengths allows the skilled artisan to determine the intensity of a specific constituent within an emission plume (see Jack et al., col. 4 line 65 – column 5 line 11).

3. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dec (U.S. Patent No. 6,025,920) and Jack et al. (U.S. Patent No. 5,831,267) in view of Wadlow (U.S. Patent No. 4,801,209).

Referring to claim 23, Dec further teaches a beam having a wavelength that is substantially in the infrared spectrum (see Dec, col. 3 lines 66-67). Dec does not teach a beam having a second wavelength that is substantially in the visible spectrum or a third wavelength that is substantially in the ultra-violet spectrum.

Jack et al. teach a first, second, and third wavelength regions (see Jack et al., col. 3 lines 1-3).

Wadlow teaches generating emission spectra which has wavelengths extending from 200 nm to 900 nm (see Wadlow, col. 2 lines 48-50). This range encompasses the ultra-violet range, 200 nm – 400 nm, and the visible range, 400 nm – 700 nm.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Dec, to include the teaching of Jack et al. because multiple wavelengths would have allowed the skilled artisan to identify individual constituents within the exhaust plume (see Jack et al., col. 4 line 65 – column 5 line 11) and to further include the teachings of Wadlow, because

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multiple wavelengths in multiple ranges of the spectrum enable the skilled artisan to determine the various constituents and intensities of the gaseous mixture (see Wadlow, col. 4 line 59 – col. 5 line 14).

4. Claims 26, 27, 29, 31 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dec (U.S. Patent No. 6,025,920) and Jack et al. (U.S. Patent No. 5,831,267) in view of Anderson et al. (U.S. Patent No. 5,884,226).

Referring to claims 26 and 29, Dec discloses determining an opacity value for an exhaust emission plume (see Dec, col. 4 lines 1-6), directing a beam of substantially monochromatic electromagnetic radiation substantially through the spatial volume of an exhaust emission plume (see Dec, col. 3 lines 43-47). Dec does not teach obtaining a measurement of an exhaust constituent amount in a spatial volume of an exhaust emission plume, measuring a transmittance of the beam of substantially monochromatic electromagnetic radiation, or calculating an opacity value proportional to the relation  $K_s = \ln(1/T)/n$ .

Jack et al. teaches obtaining a measurement of an exhaust constituent amount in an exhaust emission plume (see Jack et al., col. 6 lines 18-23), and measuring a transmittance of the beam of electromagnetic radiation (see Jack et al., col. 4 lines 10-17), the examiner interprets the term “absorption” (see Jack et al., col. 4 line 13) to mean the same as the claimed term “transmittance” (see page 2 lines 19-20).

Anderson et al. teaches calculating an opacity value proportional to the relation  $K_s = \ln(1/T)/n$  (see Anderson et al., col. 11 lines 36-43 and lines 63-66).

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The Examiner notes that the claimed equation is a derivation of Beer's Law, which is disclosed in Anderson et al..

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify Dec to include the teachings of Jack et al. because measuring the absorption can be used to determine the constituent (see Jack et al., col. 4 lines 15-17) and to further include the teachings of Anderson et al. because Beer's Law permits the skilled artisan to determine the opacity of the individual constituents (see Anderson et al., col. 11 lines 38-44).

Referring to claims 27 and 31, Dec and Anderson et al. teach all the features of the claimed invention except an exhaust constituent amount which comprises a measurement of an amount of carbon dioxide.

Jack et al. further discloses an exhaust constituent amount which comprises a measurement of an amount of carbon dioxide (see Jack et al., col. 6 lines 41-44).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Dec and Anderson et al. to include the teachings of Jack et al. because determining the carbon dioxide content of the emission allows the skilled artisan to monitor the environmental pollution (see Jack et al., col. 1 lines 6-9).



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Referring to claim 32, Dec and Anderson teach all the features of the claimed invention except measuring an amount proportional to the carbon monoxide and an amount proportional to the carbon dioxide.

Jack et al. further discloses measures an amount proportional to the carbon monoxide and an amount proportional to the carbon dioxide (see Jack et al., col. 6 lines 54-56). While Jack et al. does not specifically state summing the carbon dioxide and the carbon monoxide, it is inherently obvious to do so because summing these values allows the skilled artisan to determine the total value of the oxygenated carbons in the emission plume.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Dec and Anderson et al. to include the teachings of Jack et al. because determining the carbon dioxide content and the carbon monoxide of the emission allows the skilled artisan to monitor the environmental pollution (see Jack et al., col. 1 lines 6-9).

5. Claims 28 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dec (U.S. Patent No. 6,025,920), Jack et al. (U.S. Patent No. 5,831,267) and Anderson et al. (U.S. Patent No. 5,884,226) in view of Wadlow (U.S. Patent No. 4,801,209).

Referring to claims 28 and 30, Dec, Jack et al., and Anderson et al. teach all the features of the claimed invention except generating emission spectra in the ultra-violet range, 200 nm – 400 nm.

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Wadlow teaches generating emission spectra which has wavelengths extending from 200 nm to 900 nm (see Wadlow, col. 2 lines 48-50). This range encompasses the ultra-violet range, 200 nm – 400 nm.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Dec, Jack et al., and Anderson et al. to include the teachings of Wadlow, because multiple wavelengths in multiple ranges of the spectrum enable the skilled artisan to determine the various constituents and intensities of the gaseous mixture (see Wadlow, col. 4 line 59 – col. 5 line 14).

### ***Conclusion***

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

(a) Auth discloses an interferometer spectrometer for discrete frequency analysis of emission or absorption spectra and method.

(b) Drzewiecki teaches methods and apparatus for real time fluid analysis.

(c) Bishop et al. teaches an apparatus for remote analysis of vehicle emissions.

(d) Warnke et al. teaches infrared gas analyzer having detector elements of differing types.

(e) Wells et al. teaches a background correction method for use in gas chromatography.

(f) Zaromb teaches a remote sensing apparatus and methods.

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(g) Adachi et al. teaches a quantitative analytical method and apparatus for determining a plurality of ingredients with spectrometric analysis.

7. This is a continuation of applicant's earlier Application No. 10/093714. All claims are drawn to the same invention claimed in the earlier application and could have been finally rejected on the grounds and art of record in the next Office action if they had been entered in the earlier application. Accordingly, **THIS ACTION IS MADE FINAL** even though it is a first action in this case. See MPEP § 706.07(b). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no, however, event will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mary Kate B Baran whose telephone number

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is (571) 272-2211. The examiner can normally be reached on Monday - Friday from 8:00 am to 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marc S Hoff can be reached on (571) 272-2216. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

31 August 2004

  
MARC S. HOFF  
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TECHNOLOGY CENTER 2800